

AMENDMENTS TO THE CLAIMS

Listing of Claims

1. (withdrawn) An interconnect for testing a semiconductor component having a bumped contact comprising:

a substrate; and

a contact on the substrate configured to electrically engage the bumped contact, the contact comprising a recess in the substrate having a size approximately equal to that of the bumped contact, and a plurality of flexible metal leads cantilevered over the recess configured to support the bumped contact within the recess and to move within the recess by a distance sufficient to accommodate variations in a size, a shape or a planarity of the bumped contact, each metal lead comprising an outer layer selected to provide a non-bonding surface for the bumped contact.

2. (currently amended) An interconnect for testing a semiconductor component having a bumped contact comprising:

a substrate; and

a contact on the substrate configured ~~to~~ for electrical ~~by~~ engagement with the bumped contact, the contact comprising a recess in the substrate, ~~having a size approximately equal to that of the bumped contact,~~ a plurality of flexible leads cantilevered over the recess configured to support the bumped contact within the recess and to move within the recess by a distance sufficient to accommodate variations in a size, a shape or a planarity of the bumped contact, each lead comprising a conductive polymer outer layer configured to provide a non-bonding surface for the bumped contact during the electrical engagement.

3. (withdrawn) The interconnect of claim 1 wherein the leads comprise a polymer tape attached to the substrate.

4. (withdrawn) The interconnect of claim 1 wherein the leads comprise etched beams on the substrate.

5. (currently amended) The interconnect of claim 2 wherein the bumped contact comprises solder and the conductive polymer outer layer comprises silicone or carbon.

~~further comprising a conductive via in the substrate in electrical communication with the leads.~~

6. (withdrawn) An interconnect for testing a semiconductor component having a bumped contact comprising:

a substrate;

a recess in the substrate; and

a plurality of flexible metal leads on the substrate cantilevered over the recess configured to electrically engage the bumped contact and to move within the recess by a distance sufficient to accommodate variations in a size, a shape or a planarity of the bumped contact, each metal lead having a cantilever length, a width, a thickness and a modulus of elasticity selected to provide a desired spring constant, a shape that substantially matches a topography of the bumped contact, and an outer layer selected to provide a non-bonding surface for the bumped contact.

7. (withdrawn) The interconnect of claim 6 wherein each lead includes a projection configured to penetrate the bumped contact.

8. (currently amended) An interconnect for testing a semiconductor component having a bumped contact comprising:

a substrate having a recess;

~~a recess in the substrate;~~

a plurality of flexible leads on the substrate cantilevered over the recess configured to electrically engage the bumped contact and to move within the recess by a distance sufficient to accommodate variations in a size, a shape or a planarity of the bumped contact, each lead comprising an a projection configured to penetrate the bumped contact, and a conductive polymer outer layer comprising a conductive polymer on the projection configured to provide a non-bonding surface for contacting the bumped contact.

9. (currently amended) The interconnect of claim 8 wherein the conductive polymer outer layer comprises a material selected from the group consisting of a carbon film and a metal filled silicone.

10. (currently amended) The interconnect of claim 9 wherein the projection comprises a blade.
~~further comprising a contact on the substrate in electrical communication with the leads.~~

11. (currently amended) The interconnect of claim 8 wherein each lead comprises a metal at least partially covered by the conductive polymer outer layer.
~~the recess has four sides and the plurality of leads comprise four leads on the four sides.~~

12. (currently amended) An interconnect for testing a semiconductor component having a bumped solder contact comprising:

a substrate having a recess;

~~a recess in the substrate,~~

a plurality of leads on the substrate cantilevered over the recess and configured to move and to electrically engage the bumped solder contact within the recess, each lead comprising a metal and a conductive polymer outer layer on the metal configured to provide a non-bonding outer surface for contacting the bumped solder contact.

~~, and~~

~~a segment on the substrate electrically connecting the leads.~~

13. (withdrawn) The interconnect of claim 12 wherein the leads include a conductive connecting portion proximate to the recess for electrically connecting the leads to one another.

14. (withdrawn) The interconnect of claim 12 wherein each lead comprises at least one projection for electrically engaging the bumped contact.

15. (withdrawn) The interconnect of claim 12 wherein each lead comprises a non-bonding outer layer.

16. (withdrawn) The interconnect of claim 12 wherein the bumped contact comprises solder and the leads comprise a non-solder wettable metal.

17. (currently amended) The interconnect of claim 12 the conductive polymer outer layer comprises a material selected from the group consisting of carbon and silicone.

18. (currently amended) The interconnect of claim 12 further comprising at least one projection on each lead.

~~a conductive via in the substrate in electrical communication with the leads.~~

19. (withdrawn) An interconnect for testing a semiconductor component comprising:

a substrate;

a recess in the substrate; and

a contact on the substrate for electrically engaging a bumped contact on the component, the contact comprising a recess and a plurality of conductive beams within the recess, each conductive beam comprising an etched portion of the substrate and an etched projection at least partially covered with conductive layer configured to penetrate the bumped contact, the conductive beams having a cantilever length, a width, a thickness, and a modulus of elasticity selected to provide a desired spring constant.

20. (withdrawn) The interconnect of claim 19 wherein the substrate comprises silicon and the beam comprises an electrically insulating layer formed thereon.

21. (withdrawn) The interconnect of claim 19 wherein the conductive layer comprises a metal that is non-bonding with the bumped contacts.

22. (withdrawn) The interconnect of claim 19 wherein the bumped contact comprises solder and the conductive layer comprises a non-solder wettable metal.

23. (withdrawn) An interconnect for testing a semiconductor component comprising:

a substrate;

a recess in the substrate;

a tape attached to the substrate comprising a polymer substrate and a plurality of leads on the polymer

substrate, the leads cantilevered over an opening in the polymer substrate, and over the recess to form a contact for electrically engaging a bumped contact on the component, the leads in electrical communication with a conductive trace on the polymer substrate.

24. (withdrawn) The interconnect of claim 23 wherein the tape further comprises an electrical connector in electrical communication with the conductive trace configured for electrical connection to test circuitry.

25. (withdrawn) A system for testing a semiconductor component having a bumped contact comprising:

a carrier for retaining the semiconductor component;

an interconnect on the carrier comprising a substrate, a recess in the substrate having a size approximately equal to that of the bumped contact, a plurality of leads cantilevered over the recess configured to electrically engage the bumped contact and to move within the recess by a distance sufficient to accommodate variations in a size, a shape or a planarity of the bumped contact, each lead comprising an outer layer selected to provide a non-bonding surface for the bumped contact; and

a test circuitry in electrical communication with the leads configured to apply test signals to the component.

26. (withdrawn) The system of claim 25 wherein each lead has a radius of curvature substantially equal to a radius of the bumped contact.

27. (withdrawn) The system of claim 25 further comprising a conductive via in the substrate in electrical communication with the segment.

28. (withdrawn) The system of claim 25 wherein the leads comprise a polymer tape attached to the substrate, and an electrical connector configured for connection to the test circuitry.

29. (withdrawn) A system for testing a semiconductor component comprising:

a carrier configured to retain the component;

an interconnect on the carrier comprising:

a substrate;

a recess in the substrate; and

a contact on the substrate for electrically engaging a bumped contact on the component, the contact comprising a recess in the substrate and a plurality of conductive beams within the recess, each conductive beam comprising an etched portion of the substrate and an etched projection at least partially covered with conductive layer configured to penetrate the bumped contact, the conductive beams having a cantilever length, a width, a thickness, and a modulus of elasticity selected to provide a desired spring constant.

30. (withdrawn) The system of claim 29 wherein the interconnect further comprises a conductive via in electrical communication with the conductive beams and a terminal contact electrically connectable to test circuitry.

31. (currently amended) A system for testing a semiconductor component having a bumped contact comprising:

a testing apparatus;

an interconnect on the testing apparatus comprising:

a substrate having a recess;

~~a recess in the substrate having a size approximately equal to that of the bumped contact;~~

a plurality of leads on the substrate configured ~~to~~ for electrical engagement with the bumped contact, each lead cantilevered over the recess and configured to move within the recess ~~by a distance sufficient to accommodate variations in a size, a shape or a planarity of the bumped contact,~~ during the electrical engagement, each lead comprising a conductive polymer outer layer configured to provide a non-bonding outer surface for the bumped contact during the electrical engagement.

~~and~~

~~a test circuitry in electrical communication with the connecting segment.~~

32. (currently amended) The system of claim 31 wherein the conductive polymer outer layer comprises a material selected from the group consisting of carbon and silicone.

33. (withdrawn) The system of claim 31 wherein the leads comprise a polymer tape attached to the substrate and comprising an electrical connector configured in electrical communication with the connecting segment and the test circuitry.

34. (withdrawn) A method for fabricating an interconnect for testing a semiconductor component comprising:

providing a substrate;

forming a recess in the substrate; and

forming a plurality of leads on the substrate cantilevered over the substrate and configured to electrically engage a bumped contact on the component, each lead having a cantilever length, a width, a thickness and a modulus of elasticity selected to provide a desired spring constant.

35. (withdrawn) The method of claim 34 wherein forming the plurality of leads comprises depositing a metal layer on the substrate and then etching the metal layer.

36. (withdrawn) The method of claim 34 wherein forming the plurality of leads comprises attaching a polymer tape to the substrate with the leads formed thereon.

37. (withdrawn) The method of claim 34 wherein forming the plurality of leads comprises etching beams in the substrate within the recess and covering the beams with conductive layers.

38. (withdrawn) The method of claim 34 further comprising forming an insulating layer on the recess.

39. (withdrawn) A method for fabricating an interconnect for testing a semiconductor component comprising:

- providing a substrate;
- forming a metal layer on the substrate;
- etching the metal layer to form a plurality of leads;
- and

- etching a recess in the substrate each lead cantilevered over the substrate and movable within the substrate to electrically engage a bumped contact on the component, each lead having a cantilever length, a width, a thickness and a modulus of elasticity selected to provide a desired spring constant.

40. (withdrawn) The method of claim 39 further comprising etching a plurality of projections in the metal layer with each lead comprising at least one projection.

41. (withdrawn) The method of claim 39 wherein the leads comprise a metal selected from the group consisting of tungsten, titanium, nickel, platinum, iridium, or vanadium.

42. (withdrawn) The method of claim 39 further comprising forming an electrically insulating layer within the recess.

43. (withdrawn) The method of claim 39 wherein the substrate comprises silicon and etching the recess comprises an anisotropic etch process.

44. (withdrawn) A method for fabricating an interconnect for testing a semiconductor component comprising:

- providing a substrate;

- forming a recess in the substrate;

- providing a tape comprising a polymer substrate comprising an opening therein and a plurality of leads on the substrate cantilevered over the opening;

- aligning the leads with the recess; and

- attaching the tape to the substrate with the leads cantilevered over the recess to form a contact for electrically engaging a bumped contact on the component.

45. (withdrawn) The method of claim 44 further comprising providing the tape with an electrical connector configured for electrical connection to test circuitry.

46. (withdrawn) A method for fabricating an interconnect for testing a semiconductor component comprising:

- providing a substrate;

etching a recess in the substrate sized and shaped to retain a bumped contact on the component;

etching a plurality of beams within the recess configured to move within the recess and to support the bumped contact within the recess;

etching a plurality of projections on the conductive beams configured to penetrate the bumped contact; and

forming a conductive layer on the beams and the projections to form a contact for electrically engaging the bumped contact.

47. (withdrawn) The method of claim 46 further comprising controlling the etching of the beams step to form the beams with a cantilever length, a width, and a thickness selected to provide a desired spring constant.

48. (withdrawn) The method of claim 46 wherein the substrate comprises silicon and further comprising forming an electrically insulating layer on the beams prior to forming the conductive layer.